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regard only those characteristics which are common to normal and fully-developed specimens.

PHYSARUM SULPHUREUM Alb. and Schw. Consp. Fung. p. 93. tab. 6. fig. 1.—Plate XX, figs. 5–8.

SYNONYMS.—*Physarum virescens* Fckl. non Ditm. *Physarum chrysotrichum* B. & C. *Physarum decipiens* Curt. *Badhamia decipiens* (Curt.) Berk. *Physarum inequalis* Peck.

Sporangia scattered, stipitate or occasionally sub-sessile, spherical, 0.8–1^{mm} high. Wall granulated, bright golden-yellow. Stem, when present, one-half to two-thirds the height of the sporangium, blackish-brown. Hypothallus minute, thin, brown. *Columella absent*. Capillitium rather dense, composed of *large, angular nodes, completely filled with bright yellow granules of lime*, and connected by very short, delicate, colorless internodes destitute of lime. Spores globose, minutely verruculose or asperate. 10.7–11.8 μ in diameter, brownish-violet by transmitted light, black in the mass.

On bark of apple-trees, Manchester, Mass., August, 1889, W. C. Sturgis.

Our knowledge of this species is based upon the rather meager description and figures by Albertini and Schweinitz above referred to, and a scanty specimen preserved in the Schweinitz herbarium. There can be little doubt that the species described above is identical with that collected by Schweinitz as *Physarum sulphureum* A. and S., and it is fair to presume that Schweinitz had sufficient grounds for considering his American specimen to be identical with that found in Europe.

This species is interesting as exhibiting the close relationship existing between the two genera *Physarum* and *Badhamia*. Were it not for the few short, empty tubules which serve to connect the large nodes of the capillitium, the species would certainly be referable to *Badhamia*. The nature and brilliant color of the capillitium, and the absence of a columella, serve to separate it from the other yellow species of the genus *Physarum*.—W. C. STURGIS, *New Haven, Conn.*

EXPLANATION OF PLATE XX.—Figs. 1–4. *Comatricha caespitosa* n. sp.—Fig. 1. Habit. $\times 10$. Fig. 2. Single sporangium with capillitium and part of wall. $\times 40$. Fig. 3. Portion of capillitium and columella. $\times 240$. Fig. 4. Spores. $\times 500$.

Figs. 5–8. *Physarum sulphureum* A. and S.—Fig. 5. Habit, natural size. Fig. 6. Sporangia showing capillitium. $\times 50$. Fig. 7. Portion of capillitium and spores. $\times 240$. Fig. 8. Spores. $\times 500$.

On the vegetation of hot springs.—Accidentally, in looking over some notes that I made in 1889, I found a number of references to vegetation at a very high temperature. These caused, I remember, a good deal of sensation among my friends as well as in my own mind, and I should, indeed, not venture to place them in any journal, if not

such names as Alex. von Humboldt and Sir J. D. Hooker stood behind the facts reported. Having here no means of verification of the question I choose to reproduce my notes, not only because they are very interesting, but especially in order to find out if any one is able to give an explanation of the matter. Probably my article will be seen by some botanist who has an opportunity to investigate the subject.

1. A. von Humboldt makes the following remark,¹ giving an account of his and Bonpland's expedition to the hot springs at Trinchera. "Die Ueppigkeit der Vegetation um das Becken überraschte uns. Mimosen mit zartem, gefiedertem Laub, Clusien und Feigenbäume haben ihre Wurzeln in den Boden eines Wasserstücks getrieben, dessen Temperatur 85° betrug. Ihre Aeste stehen nur zwei, drei Zoll über dem Wasserspiegel. Obgleich das Laub der Mimosen beständig vom heissen Wasserdampf befeuchtet wird, ist es doch sehr schön grün. Ein Arum mit holzigtem Stengel und pfeilförmigen Blättern wuchs sogar mitten in einer Lache von 70° Temperatur. Dieselben Pflanzenarten kommen anderswo in diesem Gebirge an Bächen vor, in denen de Thermometer nicht auf 18° steigt."—This statement indicates a very singular adaptation in the plants mentioned. The centigrade scale was used. In his immortal *Rélation historique* (II. 98) Humboldt tells the facts in the same way, and *Kosmos* (IV, 1874, 487–88) also states them.

2. Sir J. D. Hooker says² that a hot spring which he visited in India has a maximum temperature of 190° F. (about 90° C.), and yet he found a *Cyperus*, and an *Eleocharis*(?) there, "having their roots in water of 100°, and where they are probably exposed to a greater heat."

3. Sonnerat³ found in a spring on Luzon *Aspalatus* and *Vitex agnus castus*, having their roots in water of 85° C.

4. Stanton found⁴ on the island of Amsterdam a spring, in the bottom of which *Marchantia* and *Lycopodium* were fixed, the temperature being 186° F. (86° C.).

5. Sekondat found *Tremella* in water of 62° C., while Dunbar and Hunter in springs in Louisiana noted *Conferva* as well as higher plants growing in or being influenced by water of 50°–62° C.⁵

6. Schouw saw a moss in air of 50° C. on Ætna, Sicily.

¹Reisen in d. Equinoctialgegenden, ed. 1874, II. 198.

²Hooker's Journal of Botany I (1849). 50; Himalayan Journals II. 138.

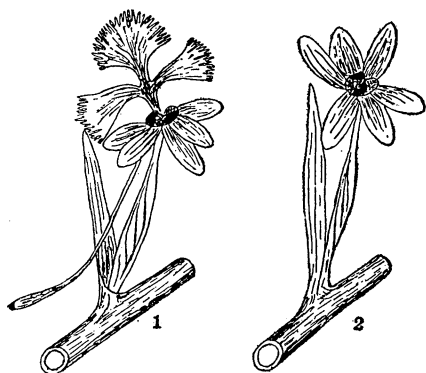
³Journal de Physique, 1774, p. 256; Voyage à la nouvelle Guinée, 1776, pp. 38–42.

⁴See Voit, Magazin für den neuesten Zustand der Naturkunde, I (1798), 22.

⁵See H. G. Bronn: Handbuch einer Geschichte der Natur, II (1843). 44–45 for references.

7. Goeppert found⁶ the mosses, *Dicranum purpureum*, *Bryum caespitium*, *Bryum argenteum*, *Funaria hygrometrica*, and further, *Poa annua*, *Agrostis vulgaris*, *Hypochaeris radicata*, and *Polygonum aviculare* in a place where they were in contact with steam or vapor of 63° C.; while he found, three inches under the surface, a temperature of 56° C.

On the well-known phenomenon of certain algae being found in hot springs, I could bring a good deal together here, but it is known that Cohn many years ago took this question up. For the other facts, I am able to give no explanation, when I consider the much written on temperature-maxima for growth and other life phenomena.—J. CHRISTIAN BAY, *Missouri Botanic Garden*.



HABENARIA FIMBRIATA.

1, normal form; 2, variety.

Habenaria fimbriata, var. —During a collecting tour with Mr. H. E. Sargent, in the summer of 1892, a large quantity of the type form of this orchid was found August 2nd, in full bloom, in moist woods a few miles east of Lynn, N. H. This species is much less common than the nearly related species, *H. psychodes*. The latter at the above date had barely begun to bloom, while *H. fimbriata* had in some cases passed

its prime already. In color, an unusual number of spikes were nearly white and a large number were gathered in a hasty run through the woods. In addition two spikes of a very peculiar variety were found, but were not noticed at the time, or others would have been looked for. One of the two had the light purple flowers of the type while the other was white. In size and foliage there was nothing unusual about them, except that the spikes were much more slender than the type and linear rather than oblong. The flowers, however, were strangely modified, as is shown in the figures accompanying this paragraph. Fig. 1 is the ordinary form, fig. 2, the variety. In the variety the sepals and petals are all entire and alike in form and size, except as in two or three flowers on one of the spikes there is a slight suggestion of a fringed lip. The long and prominent spur, in the type moreover, is here entirely wanting, the ovary is considerably longer and more

⁶Wiegmann's Archiv für Naturgeschichte, 1 (1837). 208-210.